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Autor: Matsuo, Yoshio
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7. Fujigawa Bridge Rehabilitation Project (Japan)

Owner:	<i>Shizuoka Prefecture</i>
Contractor:	
<i>Substructure:</i>	<i>Sumitomo Construction</i>
<i>Deck replacement:</i>	<i>Japan Bridge</i>
<i>Superstructure:</i>	<i>Yokogawa Bridge Works</i>
Work's duration:	<i>6 months</i>
Date of repair:	<i>1987 – 1988</i>

The Fujigawa Bridge, completed in 1924, over the Fuji River on Route 1 is a bridge with six-span curved chord pratt truss having a bridge length of 300.1 m, roadway width of 7.3 m and span of 65.4 m (Fig. 1). Route 1 is the most important road in Japan, and 60 years after completion of the bridge, the daily traffic flow was 21 000 vehicles, though bypass roads had been completed upstream and downstream of the bridge.

After many years of use, such problems as cracked concrete decks, corroded outer stringers, overstressed and deflected stringers, and scouring at the piers due to the lowered river bed of the Fuji River have occurred. Also, as a result of the increased traffic flow, traffic congestion caused by right turning cars holding the traffic had become a big problem.

To solve these problems, the substructure of the bridge was reinforced, and the stringers and deck on four spans to the left bank were replaced. Moreover, two spans to the right bank were replaced in order to install a right turning lane by the method that was chosen to complete the job with the least disturbance to traffic.

For widening on the two spans to the right bank side, the roadway could not be widened by just adding stringers because the original bridge was a through truss. Because of this, it was decided to replace the bridge with the same type of truss (curved chord pratt truss) having wider floor beams. According to the replacement procedure, a new bridge was erected along the existing bridge, and the deck work, pavement work and painting work were carried out for the new bridge. Then, the bridge was laterally transferred in place of the original

bridge while the traffic was stopped for a short period. A walkway bridge alongside the bridge will be also laterally transferred in the process.

The superstructure replacement procedure is as follows (Fig. 2):

- step 1. Make foundation for erection work.
Assemble bent for assembly and lateral transfer.
Assemble new superstructure along side of existing bridge.
Concrete deck is finished.
- step 2. Two span of walkway bridge is transferred upstream to make room and replaced by temporary walkway bridge.
- step 3. Lateral transfer equipment are set in place.
Two span of new and old superstructures are lateral transferred separately upstream (Fig. 3).
- step 4. Disassemble existing superstructure.
Disassemble assembly bent.
- step 5. Lateral transfer walkway bridge to original position.
Disassemble lateral transfer bent.

The special conditions of work are as follows:

- 1) Since there was no bypass road, the method which gave the least disturbance to traffic was adopted and the extent of traffic stop was kept to a minimum.
- 2) Since the construction site was located in the Fuji River, which is one of the three major rapids in Japan, full safety measures were taken against floods. Work for substructure and superstructure were performed during the dry season (November to May) and this short allowable working time was a difficult condition for the superstructure work.

Fortunately there were no major floods, but full counter measures against floods were taken, and the work was completed safely.

The replacement work was performed by stopping the heavy traffic through Route 1. The work was safely completed without causing traffic congestions by means of PR activities performed in advance.

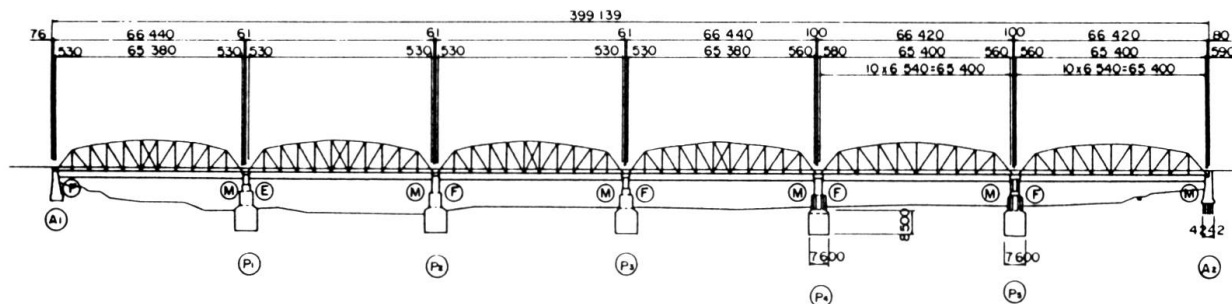


Fig. 1 Elevation

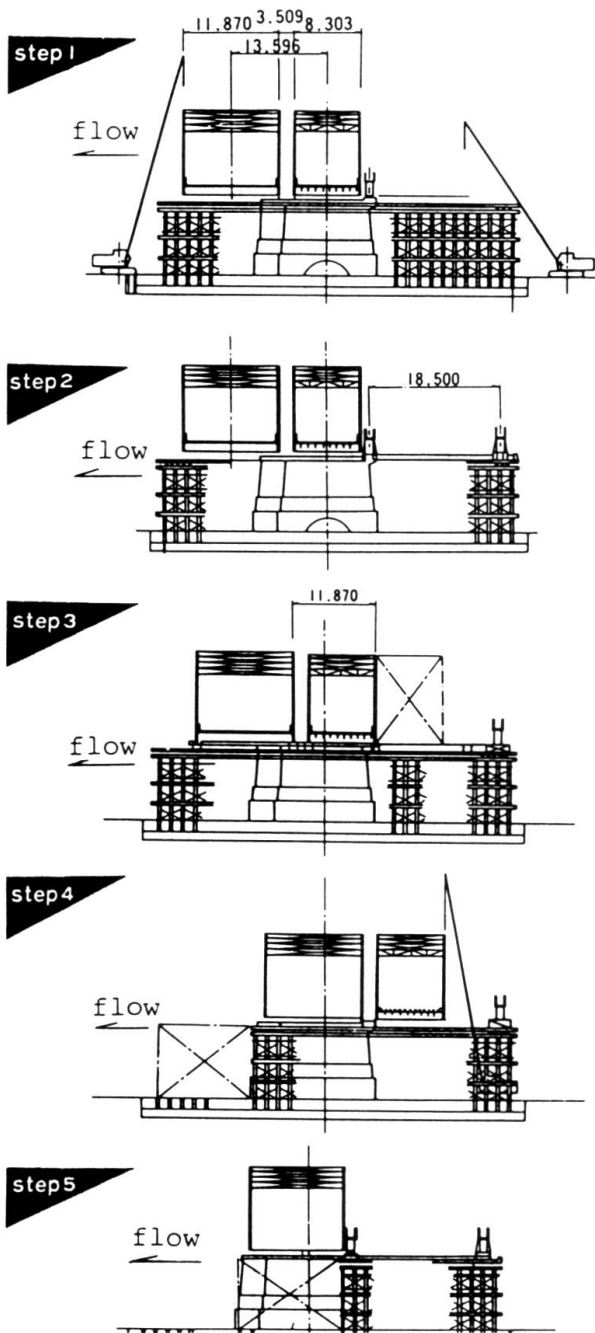


Fig. 2 Erection sequence

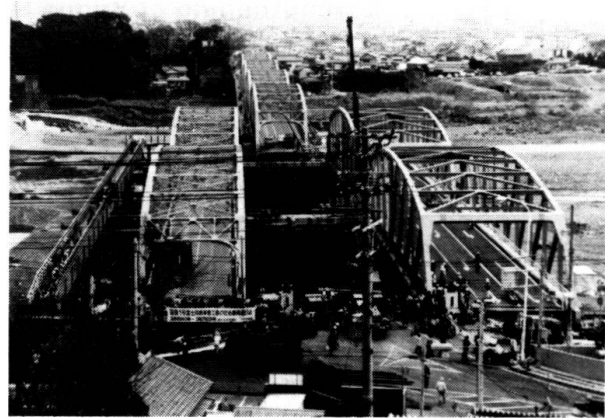


Fig. 3 Lateral transfer

The replacement of the bridge after assembly, deck and pavement completed required the handling of a large weight (830 tons/series). But the lateral transfer method was still capable of moving the superstructure with the least period of traffic stop. The lateral transfer procedure took 60 hours but a considerable time was taken for setting and anchorage of bearings. This was due to the time required for opening anchor holes and bearing mortar to harden. With some modification and improvements, it may be possible to reduce the time. The lateral transfer itself took only a short time with the up-to-date equipment that was employed.

(Yoshio Matsuo)